

Remarks

Reconsideration and allowance of the subject patent application are respectfully requested.

Claims 1, 5-7, 10, 17, 18, 21-26, 28 and 31-38 were rejected under 35 U.S.C. Section 103(a) as allegedly being "obvious" over Maitani et al. (U.S. Patent No. 6,656,828) in view of Ianuzzi et al. (U.S. Patent No. 4,176,443). While not acquiescing in this rejection for reasons previously stated, claims 1, 17, 25 and 35 have been amended (with conforming amendments or canceling of dependent claims) and the discussion below makes reference to the amended claims.

The independent claims require that the metal layer is formed only in an opening in an insulating layer and comprises a nickel-containing layer having a lower surface in contact with a copper or copper-containing upper surface portion of a wiring layer, and a gold or gold-containing layer having a lower surface in contact with an upper surface of the nickel-containing layer and an upper surface in contact with a lower surface of a protruding electrode.

Figure 5 of Maitani et al. discloses forming a gold layer 15 in an opening formed in polyimide layer 3. Among other things, there is no disclosure or suggestion in Maitani et al. of an insulating layer having an opening therein that exposes a copper or copper-containing upper surface portion of a wiring or conductor layer. Maitani et al. likewise fails to disclose or suggest a nickel-containing layer formed only in the opening and having a lower surface in contact with the copper-containing upper surface of the wiring or conductor layer. Maitani et al. also does not disclose or suggest a gold or gold-containing layer having a lower surface in contact with an upper surface of such a nickel-containing layer.

Applicants note that while Maitani et al. discloses a nickel layer 14, this layer is provided for the express purpose of preventing diffusion into resin layer 3. See, e.g., Abstract ("...the surface of the Cu interconnection (6) is covered with a barrier layer (14) to thereby prevent diffusion of Cu from the CU interconnection (6) into a polyimide resin layer (3) by a heat treatment during the manufacturing process."); col. 7, lines 40-45. Consequently, it would be contrary to the express teachings of Maitani et al. not to provide nickel layer 14 between Cu interconnection 6 and resin layer 3.

Ianuzzi et al. does not remedy the deficiencies of Maitani et al. with respect to the claims.

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Serial No. 09/883,366

Response to Office Action dated January 25, 2006

Ianuzzi et al. discloses terminal leads 12 that contact insular zones of a wafer region via a base layer 2 of aluminum, a first intermediate layer 3 of chromium or titanium, a second intermediate layer 4 of nickel and an outer layer 5 of gold or platinum. See Figure.

Like Maitani et al., Ianuzzi et al. does not disclose an insulating layer having an opening therein that exposes a copper or copper-containing upper surface portion of a wiring or conductor layer. Ianuzzi et al. likewise fails to disclose or suggest a nickel-containing layer formed only in the opening and having a lower surface in contact with the copper or copper-containing upper surface of the wiring or conductor layer. Ianuzzi et al. also does not disclose or suggest a gold or gold-containing layer having a lower surface in contact with an upper surface of such a nickel-containing layer.

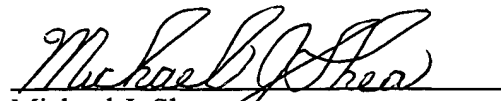
Because of these deficiencies, even were Ianuzzi et al. combined with Maitani et al. for some reason, the subject matter of the pending claims would not have resulted.

Claim 19 was rejected under 35 U.S.C. Section 103(a) as allegedly being "obvious" over the proposed Maitani et al.-Ianuzzi et al. combination, in further view of Greer (U.S. Patent No. 6,451,681). Greer does not remedy the deficiencies of the proposed Maitani et al.-Ianuzzi et al. combination with respect to claim 17 (from which claim 19 depends). Because of this dependency and because of the additional patentable features therein, claim 19 would not have been made obvious by the proposed combination of Maitani et al., Ianuzzi et al. and Greer.

Applicants submit that the pending claims are in condition for allowance, and action to that end is earnestly solicited.

If any issues remain to be resolved, the Examiner is urged to contact the attorney for Applicants at the telephone number listed below.

Respectfully submitted,
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